

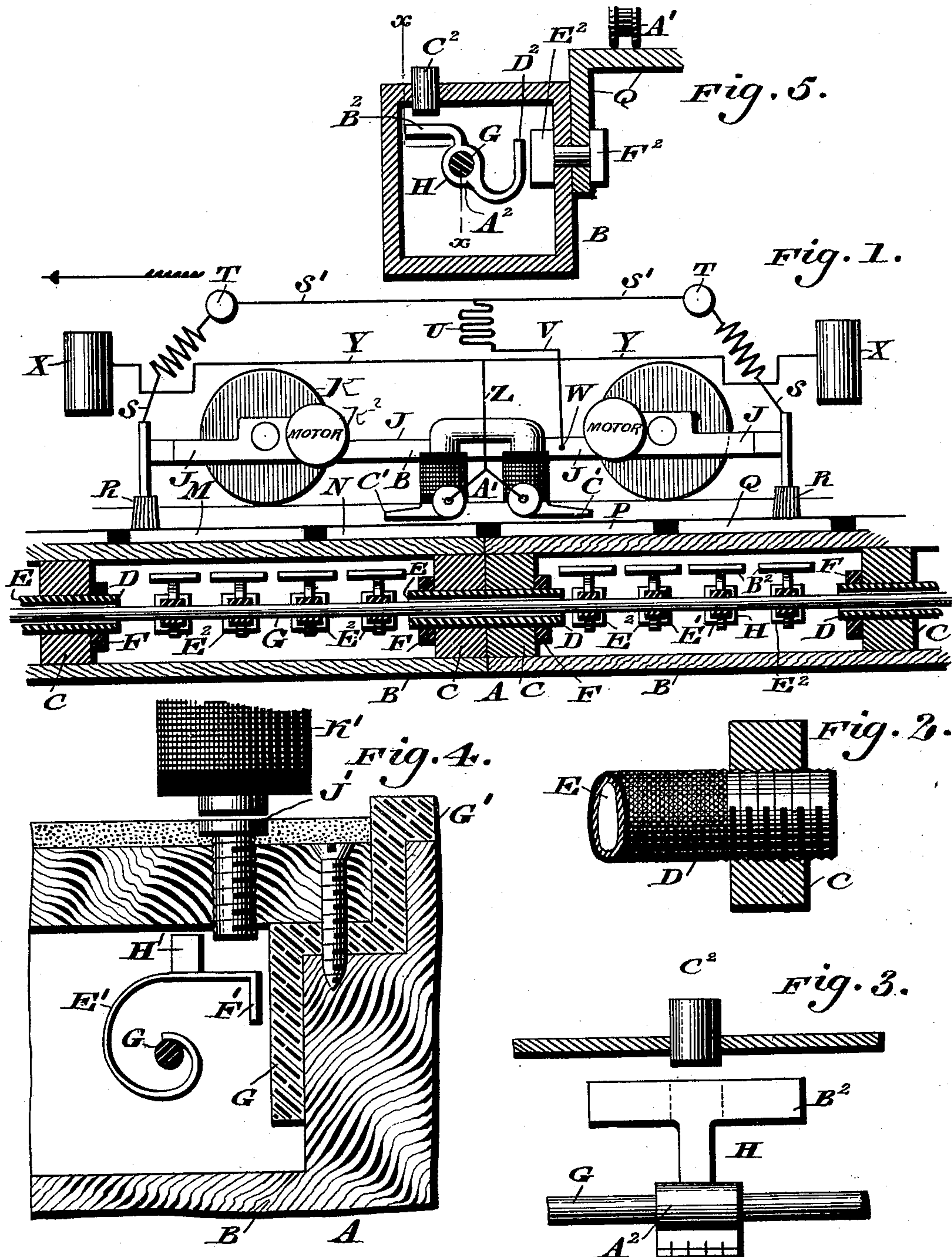
(No Model.)

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INDICATOR FOR UNDERGROUND ELECTRIC RAILWAYS.

No. 594,122.

Patented Nov. 23, 1897.



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INDICATOR FOR UNDERGROUND ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 594,122, dated November 23, 1897.

Application filed June 4, 1896. Serial No. 594,223. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. REAGAN, Jr., a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Indicators for Underground Electric Railways, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of a novel construction of indicator for electric railways in which normally invisible movable contacts are employed for the purpose of conducting electricity from a feed-wire contained within an underground conduit to a suitable conductor located exteriorly of said conduit, the electricity being conveyed thence in any suitable manner to the car-motor, and provision being made for readily and instantly detecting when any one of the sectional conductors which are in connection and the invisible contact devices contained within the conduit is improperly alive, thereby indicating to the motorman or attendant whether any portion of the underground apparatus is out of order and enabling him to prevent any person or animal from receiving a shock upon stepping upon the exterior conductor.

It also consists of a novel construction of conduit for an underground railway, said conduit being constructed in sections of certain predetermined lengths, which have blocks of wood or other suitable material secured therein and are held together in the novel manner hereinafter set forth.

It further consists of novel details of construction, all as will be hereinafter set forth, and specifically pointed out in the claims.

Figure 1 represents a side elevation, partly in section, of an indicator for underground electric railways and its adjuncts embodying my invention and also the preferred form of conduit employed in connection therewith, the conduit being taken on line $x\ x$, Fig. 5. Fig. 2 represents, on an enlarged scale, a detail view showing the manner of assembling the different portions of the conduits. Fig. 3 represents a modified form of contact device and its adjuncts embodying my invention. Fig. 4 represents a cross-sectional view of a movable contact device employed, to be

hereinafter referred to. Fig. 5 represents a transverse section.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates a conduit, the same consisting of the sections B, which are constructed of any suitable material and may be of any predetermined or desired length.

C designates blocks of wood or other suitable material, which are secured in any convenient manner in the ends of the sections.

D designates a hollow bolt or sleeve which is adapted to be inserted through two contiguous blocks, upon the threaded ends of which sleeves are screwed the nuts F, it being of course understood that the interior of said sleeve is lined with any suitable non-conducting material E.

G designates a feed-wire which may be supported within the conduit in the manner described in a prior patent granted to me, said feed-wire having the contacts H movable or oscillatory thereon, said contacts serving to form communication between the feed-wire and a sectional conductor having a portion extending exterior to said conduit.

J designates the frame of a car, the same having the car-wheels K suitably journaled thereupon, and also serving to support the car-motors K².

M, N, P, and Q designate sections of a conductor which have suitable insulation therebetween and are energized through the medium of the contact devices H in any suitable manner, the relative position of the car to said conductors being indicated in Fig. 1, in which the conductors N and P are shown as being alive, while the conductors N and Q are supposed to be dead when the apparatus is in proper working order, since the oscillatory contacts thereunder are removed from the influence of the magnets.

R designates brushes which are suitably supported upon the car-frame J, from which brushes the wire S leads at either end to the indicator T, which may be a fuse, electric bell, voltmeter, or other similar device adapted to be operated by an electric current. S' designates conductors extending from each of said indicators T toward each other, where

they join, and lead to the resistance-coil U, from which the wire V leads, which is grounded in the car-frame at the point W.

X designates controllers, which are shown at either end of the car, from which lead the conductors Y; which communicate with the branch Z, which leads to the collector-wheels A', which are supported in any suitable manner and run on the sections of the conductors M N P Q, &c.

B' designates a magnet which is employed for attracting at the proper intervals the movable contact H, said magnet being provided with the laterally-extending feet or shoes C'.

In the construction seen in Fig. 4, G designates a feed-wire, and E' a coil or resilient spring or strip of yielding material which is mounted thereupon, the same having an end F', which is deflected downwardly and is adapted to be drawn against the conductor G' at the proper intervals through the medium of the armature H', which is mounted on said spring, said armature being attracted by the lines of force which pass through the pin J' when the magnet K' is adjacent thereto, said pin forming a magnetic path for the lines of force passing into the interior of the conduit.

The operation is as follows: If we assume the car to be moving in the direction indicated and the contacts or switches being attracted to the sectional conductor by the magnet B' at the proper intervals, and falling away therefrom as the magnet progresses, if any one of said contacts should for any reason remain improperly in contact with the sectional conductor Q, which ought normally to be dead, the latter being insulated from its neighbors on either side and receiving no current from them, it will be apparent that the brush R, which is in contact with said conductor Q, will convey the current up through the wire S, through the circuit to the indicator T, and thence through the resistance-coil to the negative side of said circuit. If the indicator T be a fuse, it will blow out, indicating to the motorman that that section is alive, and if a bell or other similar device is employed that fact will be similarly indicated, and the motorman on being informed thereof can then display a red flag or other signal to indicate to the public that the section, as Q, is alive, and call upon the proper authorities for repairs. It is evident from the foregoing that a car cannot move away from a sectional conductor which is improperly alive without a warning being given, and since every car is equipped as described the road is continually being tested, since each car passing over the road in either direction will have its indicating apparatus thrown into operation if anything is wrong within the interior of the conduit. The device is positively operative under all conditions, since nothing will actuate the rotatable contact devices except cars specially equipped to operate the same, and as they progress the attendant will be notified the instant anything is out of order. The above

construction is applicable to underground railways in which a sectional conductor, three-rail, or pin system is employed.

The conduit A is assembled in the following manner: The sections B thereof are cut separately to the desired lengths, the top C³ of each being removable, and into each end thereof is fitted a tight head of wood or other suitable material. These heads have holes therein through which the sleeve or hollow bolt D is passed, the same being threaded at each end and having the nuts F' screwed thereupon, it being evident that when said nuts are tightened up against each head or block, as in Fig. 1, the sections will be drawn tightly together, thereby positively making a tight joint. After the several sections have been assembled to the desired extent the feed-wire G can be threaded through the same in any suitable manner, and the tops C³ of each section being removed it will be evident that the required number of contacts H can be placed on said feed-wire within each section of the conduit as said wire is propelled or drawn therethrough, said tops being afterward replaced in position.

It is evident that by my construction of sectional conduits the several sections may be fitted up in the shop and then shipped and assembled at a distance therefrom wherever it is desired to lay them.

Attention is called to the fact that I do not employ a continuous conduit open throughout its length, but a series of sections, boxes, or pipes, each of which has heads in its ends and a sectional conductor extending from the interior to the exterior, each section also containing a number of contacts mounted on the feed-wire contained therein, as has already been described.

The operation of the device seen in Fig. 4 will, it is thought, be apparent without further description, the contact between the depending end of the coil or spring mounted on the feed-wire and the conductor being effected whenever the magnet is moved into juxtaposition with the paths which are located in the conduit, as is evident.

The manner of conducting the electricity from the feed-wire to the sectional conductors need not be described by me, as the same forms the subject of contemporaneously pending applications filed by me, although I preferably employ the contact device seen in Fig. 3, the same having the body portion A², from which extends the elongated armature or head B², which is attracted at the proper intervals by the lines of force which pass through the paths C² when a magnet, as K' or C', passes over the same, said elongated armature causing a greater extent of metal to be exposed to the lines of force.

D² designates a resilient arm attached to the body A², which is adapted to contact with the head E² of the bolt F², by means of which the sectional conductor Q, P, or N and C is secured to the side of the conduit B, the col-

lector-wheel A' being adapted to travel on the laterally-extending flange of said conductor, as will be understood from Fig. 5.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric railway, an insulated continuous sectional conductor, energizing means for its sections, brushes or other contact devices carried upon each end of a car and adapted to contact with different sections of said conductor, an indicator connected with each of said brushes, a resistance-coil connected with said indicators and a wire from said resistance-coil grounded in said frame.

2. In an electric railway, a conduit composed of a series of pipes or boxes forming sections, each of the latter having a removable top, a head in each end of said sections, an opening in each head, a hollow sleeve or bolt passing through said heads, and means for holding said sleeve or bolt in position, said hollow bolt having insulation in its interior, and being adapted to allow a feed-wire to pass therethrough.

3. In an underground electric railway, a feed-wire, means for supporting the same, a conduit composed of sections having a removable top and heads of wood or similar material in the end of each section, openings in said heads, a hollow sleeve or bolt fastened in said openings, inclosing said feed-wire, the ends of said sleeve being threaded and having nuts engaging therewith, which are adapted to pull the aforesaid heads together when said nuts are tightened.

4. In an electric railway, a feed-wire having oscillatory contacts mounted thereupon, supporting devices therefor, a conduit composed of sections having removable tops and heads located in the ends thereof and provided with apertures, and means for holding said heads and the ends of said sections in juxtaposition.

5. In an electric railway, a feed-wire, a conduit therefor, a sectional conductor, a strip of resilient material coiled around said feed-wire at substantially a right angle thereto, an armature attached to said strip, the terminal of the latter being adapted to abut against said conductor, and thus complete the circuit when a magnet is brought into proximity to said armature.

6. In an electric railway, a feed-wire, an oscillatory contact mounted thereon, said feed-wire serving as an axis for said contact, the latter having a portion thereof, composed of resilient material, and an elongated armature B² attached to said contact, for the purpose of exposing a greater extent of metal to the lines of force.

7. In an electric railway, a closed conduit, made in sections, each of the latter having a removable top and apertured heads located in their ends, in combination with means for holding said heads and the ends of said sections in juxtaposition.

8. In an electric railway, a closed conduit made in sections, each of the latter having a removable top, apertured heads located at or near the ends of said sections, and means for holding said heads and the ends of said sections in juxtaposition, in combination with a feed-wire passing through said conduit.

9. In an electric railway, a conduit, a feed-wire suitably supported therein, an oscillatory contact mounted on said feed-wire, the latter serving as an axis therefor, a portion of said contact being composed of resilient material, a conductor against which the latter is adapted to abut, means for conveying electricity from said conductor to a car-motor, an elongated armature attached to said contact, and means for magnetically operating said armature from the exterior of said conduit.

10. In an electric railway, a conduit, a feed-wire suitably supported therein, an oscillatory contact mounted on said feed-wire, the latter serving as an axis therefor, a portion of said contact being composed of resilient material, a bolt or similar fastening device against which the latter is adapted to abut, a conductor held against a side of said conduit by said bolt, means for conveying electricity from said conductor to a car-motor, an elongated armature attached to said contact, and means for magnetically actuating said armature from the exterior of said conduit.

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Witnesses:

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